

# A PRELIMINARY SURVEY OF THE SALTWATER CROCODILE (*CROCODYLUS POROSUS*) IN THE ANDAMAN ISLANDS<sup>1</sup>

R. WHITAKER AND Z. WHITAKER  
(With five plates)

During April, 1975 and May-August, 1976, survey trips were made to most of the major freshwater streams and associated tidal creeks on the east of South, Middle Andaman and North Andaman, part of the west of North Andaman, and some of the outlying islands. Crocodiles were found to be much depleted compared to earlier reports, mainly due to hunting in the past and now due to human settlements on almost all the fresh water streams and the associated requisite nesting habitat of *C. porosus*. Besides intensive human pressure, nests of *C. porosus* are susceptible to flooding and predation, especially by the Water Monitor Lizard (*Varanus salvator*) which is common in the islands.

The junior author, accompanied by an Iruka snake catcher, arrived in Port Blair on 20th March 1975. She proceeded to North Andaman and spent 25 days seeing habitats in

which crocodiles were reportedly once plentiful. The following is a brief account of her survey.

<u>Date</u>	<u>Place</u>	<u>Findings, Remarks</u>
22-3-75	Port Blair	Interviewed local officials in Forest and other departments, local residents. Crocodiles scarce in South Andaman. Used to be a fairly regular flow of skins through Port Blair to the mainland; no statistics available.
23, 24-3-75	South Andamans	Interviewed local settlers. Two kinds of crocodiles reported one light yellow and one dark species. Reports of crocodile attacks on man in Middle and North Andaman; very rare now. During early settlements (early 1950's), average of one or two people killed a year in northern area.
28-3-75	Aerial Bay, North Andaman	Interviewed local Forest Officers and met local crocodile hunter Kesavan. Measured skull of crocodile 94 × 42 cm said to have measured 21 ft.
29-3-75	Aerial Bay	For next few days visited mangrove creeks running inland from Aerial Bay. Tracks of several crocodiles seen in less travelled creeks.

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<u>Date</u>	<u>Place</u>	<u>Findings, Remarks</u>
3-4-75	Mayabandar	Interviewed local residents; crocodiles killed off in Austen Creek several years back.
5-4-75	Kalighat	Saw large 4-5 metre crocodile in main creek near Kalighat jetty.
6, 12-4-75	Mayabandar Panighat Webe Lucknow	Interviewed Karens and others; crocodile hunting and hooking techniques described. Formerly speared (detachable head type), now mainly caught on baited hooks left overnight with large conspicuous buoy attached. Followed up and pulled out next day, crocodile despatched with axe blow to head.
13-4-75	Rangat, Middle Andaman	Interviewed local settlers; crocodiles scarce since days of first settlements (early 50's).
14-4-75	Port Blair, surrounding mangrove swamps, Bamboo Flat etc.	Crocodiles still sporadically seen in creeks off Shoal Bay. Level of disturbance extreme on much of South Andaman.

In June 1976, the senior author arrived in Port Blair and spent the following 20 days in crocodile habitat mainly in North Andaman.

He was accompanied by Mr. Ashok Sinha, ACF, for part of the trip and by Mr. Allen Vaughan for the whole trip.

The following is a brief account of his survey:

<u>Date</u>	<u>Place visited</u>	<u>Mode of transport</u>	<u>Findings, Remarks</u>
3-6-76	Arrived Aerial Bay, visited Muger Nullah and Bazaar	Walk	Met several (ex) crocodile hunters and egg collectors. One hunter said to have killed nearly a thousand. Crocodiles scarce now.
4-6-76	Durgapur, Shivpur	Walk	Saw habitat, interviewed settlers. Few crocodiles in the Shivpur creek.
5-6-76	Smith Island, Gandhi-Nagar in Aerial Bay	Launch, Walk	Saw major creeks, interviewed forest labour and settlers. Crocodiles scarce but feared by the timber raft workers. Extensive clearing and disturbance in potential nesting areas as settlers collect cane, bamboo and palm fronds for construction.
6-6-76	Two largest creeks in Aerial Bay	Dugout, Walk	Saw nesting habitat restricted to upper stream, now settled and farmed; most perennial streams in North Andaman (except extreme north) have been settled upon.
7-6-76	Diglipur market Badaltikeri	Walk Launch, Walk	Crocodile eggs on sale at Rs. 1/- each. Accompanied N. A. Ranger, Mr. Mukhopadhyaya to seize a crocodile skin and fat from forest labour.
8-6-76	Manjunullah (Cadell Bay)	Launch, Walk	Made camp and visited nearby creeks.
9-6-76	Creeks of Cadell Bay	Dugout, Walk	Searched for suitable nesting habitat which is scarce. Saw one 4 m crocodile near camp.

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Date	Place visited	Mode of transport	Findings, Remarks
10-6-76	Creeks North of Cadell Bay return to Aerial Bay	Dugout, Walk	Found 2 crocodile skulls and bones at hunters camp site. Little nesting habitat, no evidence of crocodiles.
11-6-76	Kalipur and down Shivpur creek	Walk, Dugout	Saw fresh tracks of five crocodiles in 5 km of creeks. No nesting habitat.
12-6-76	Mangrove and cane fringes in Aerial Bay	Walk	Saw 2 old nests but no other sign of crocodiles.
13-6-76	Laxmipur, Milangram, Swarajgram, Radhanagar, Shamnagar	Walk	Interviewed settlers, saw good crocodile nesting habitat; reportedly, most crocodiles killed several years back. New clearing in progress, crocodile encounters expected.
	Parseemsagar (West coast)	Walk, Dugout	Night visits to creeks, three crocodiles seen. Reports of plenty of crocodile killing in past.
14-6-76	Creeks near Shamnagar (RW)	Walk	Suitable nesting habitat, no signs of crocodiles. Extensive settlement and clearing.
	Creeks near Parseemsagar (AV)	Walk	Extensive rice cultivation in best habitat, no sign of crocodiles by day.
15-6-76	Mayabandar, nearby mangroves	Ferry, Walk	Crocodiles finished off in the Mayabandar area several years ago. Extensive settlement, creek traffic.
16-6-76	Parangara, Kishorinagar	Ferry, Walk	Walked through mangrove and grass habitat on settlement edge. Located 2 old nests and one intact nest of 51 eggs. Interviewed settlers.
17-6-76	Kishorinagar and surrounding area	Walk	Good nesting habitat near settlement but much disturbance and crocodiles scarce now. One old nest and crocodile bones seen.
18-6-76	Kalighat	Walk	Interviewed settlers, saw some good habitat but much disturbed. One crocodile regularly seen in main creek near jetty (ZW '75).
19-6-76	Mayabandar, Port Blair	Ferry	In South Andaman R. Whitaker visited Chidiatapu, Bamboo Flat, Wimberleyganj and other nearby areas, interviewing settlers and forest department staff. Reports of crocodile scarcity in Andamans. Most experienced people confirm that Little Andaman and some parts of the Nicobars still have fairly intact crocodile populations.

We feel that unless survey work in more inaccessible parts of N. Andaman turns up a small protected breeding group, Andamans can be considered to have a very scattered crocodile population breeding sporadically. Shivpur Creek near Diglipur, was observed to have the largest adult population but no nesting habitat. Most perennial streams in North Andaman, East coast of Middle and South Andaman have been settled upon.

Optimum crocodile nesting habitat and juveniles (intolerant to saltwater) optimum habitat is analogous to paddy land (i.e. flat stream drainage area just prior to the brackish water level). This steady (and continuing) loss of habitat formerly resulted in crocodiles being killed or moving to more remote (and perhaps less suitable) areas. Crocodiles are reported on several of the smaller offshore islands including North Reef (now a sanctuary), Land-

fall and parts of Ritchie's Archipelago. If these areas are assessed to be suitable (nesting habitat, prey, freedom from disturbance and, most important, fresh water), they may provide possible reserves for *C. porosus*.

Visits by the senior author in June-July 1977 to larger islands such as Interview Island, Smith Island, Sound Island, Anderson Island in North Andaman, Rutland and Labyrinth Islands in South Andaman yielded no evidence of crocodiles. Interviews with police outpost personnel, inter-island boat captains, crew and others concerning Cinque Islands, South Sentinel Island, Narcondam Island and Barren Island (the last three now sanctuaries) confirms there are no crocodiles on these either. Jackson Creek on the west coast of Little Andaman is reported to have a fair crocodile population. The East Coast of this Onge island is now suffering from intensive clearance and settlement developments.

The Nicobar Islands are still inadequately surveyed faunistically. In interviews with Police Wireless operators formerly posted there, plus inter-island ship captains we were able to confirm the presence of crocodiles on Teresa, Bompoka, Comorta, Trincat, Kachal, Nancowri, Little Nicobar and Great Nicobar. Older reports describe seeing occasional crocodiles on Car Nicobar, it is not known whether Tilanchong or Chowra have any. Nicobarese (in southern islands in particular) reportedly kill crocodiles occasionally to eat but no systematic hide hunting has ever been carried out in this group. Reports from Campbell Bay on Great Nicobar where clearance and settlement of primeval forest is now being intensified show the same pattern of events that led to the drastic decline of *C. porosus* in North Andaman. A letter from Mr. Humayun Abdulali (1977), who has been leading Bombay Natural History Society Expeditions

to the Islands since 1964, confirms this. The large freshwater streams of the 600 sq km Great Nicobar: Galathea River, Alexandra River and Dagmar River are said to contain crocodile populations. These areas are so far mostly unsettled and are inhabited by the small scattered tribe called Shompen. Considering the reported relative lack of commercially valuable trees on Great Nicobar (Bonington, A & N Census, 1931) the presence of a healthy crocodile population points to forestry efforts toward management of crocodiles for revenue earning. The precedent has been set in Orissa, Rajasthan and Uttar Pradesh with major Forest Department crocodylian projects resulting from the FAO/UNDP programme under the consultancy of Dr. H. R. Bustard, at present in India. At this time it would be most valuable to undertake a complete, well supervised survey of the crocodile resources of the Nicobars. The senior author returned to Madras end June. From early July till late August Allen Vaughan visited areas in Middle Andamans not visited by the authors.

Vaughan feels the main crocodile nesting area left in the main islands (besides the Jarawa Reserve) is the Kalighat-Parangara area including the creeks near Stewart I. In 1977 four nests were reported from one, remote creek there. (For Vaughan's report see p. 48).

#### *Other Notes:*

One of the oldest extensive descriptions of the Bay Islands is a Government of India (Home Department) publication "The Andaman Islands", published in 1859. Reporting on the animal life it states: "The reptiles are snakes (several species), lizards, iguanas, tortoises and turtles". No mention is made of crocodiles. In 1863 Dr. F. J. Mouat published his book "The Andaman Islanders" and in a fauna list states "Of the crocodile group, so



far as I can learn, no species has been observed". The 1908 Local Gazetteer describes the Islands in detail but again no mention of crocodiles (though the abundance of sea turtles is stated). A letter from a Moravian missionary in the Nicobars in 1813 gives the first description of crocodiles in the Nicobars; this reference was evidently not seen by later authors: "Crocodiles are very numerous, wherever there are water, lakes and streams. They are of two kinds, the black kayman and the proper crocodile the former which is smaller, is fierce and rapacious; the latter is said never to attack any living creatures, but only to devour carrion".

In 1870, Dr. F. Stoliczka of the Geographical Survey of India states "There is no doubt of the occurrence of a crocodile on the Nicobars". Only in the Census report of 1931 is the question of crocodiles in the Bay Islands satisfactorily presented: "Some authorities have disputed the presence of crocodiles in the Andamans. They are common in the Andamans and also in the Nicobar but they are not found everywhere. They breed in the Diglipur stream of Port Cornwallis, where they are common, and in Jackson Creek of Little Andamans". Oddly, M. A. Smith, in a 1941 paper "The Herpetology of the Andaman and Nicobar Islands" lists crocodiles as being found in the Nicobars but not in the Andamans.

Later, in 1960 the author Suresh Vaidya wrote: "In calling at Port Cornwallis we had a special objective in view: We wanted to shoot crocodiles in the Diglipur Creek, the place was said to crawl with these creatures." and "The crocodiles have become wary since these Bengali farmers started trapping them. They sell the skins". In his book on the Nicobars, K. K. Mathur in 1976 wrote "The rivers of Great Nicobar are full of crocodiles".

## CONCLUSION

Crocodiles were once abundant in most of the major streams and creeks in the Andamans. Since they must drink fresh water, and the young probably cannot survive in highly salty water and since optimum nesting (tall grass, cane and bamboo fringe) is usually in the transition swampy areas above the brackish mangrove fringe the crocodiles were always associated with these fresh water sources. There are few large perennial freshwater streams in the Andamans and all (with the exception of the Jarawa area) have been settled or illegally encroached upon. During the time of legalized crocodile hunting (prior to 1972) interaction between man and crocodile at the freshwater streams resulted in crocodile hunters getting every help and encouragement from settlers to whom the crocodile was (and is) looked upon as a nuisance.

There are, unfortunately, few Forest Department protection staff for the large and difficult area to be protected and some crocodile killing and egg eating still prevails. Eggs now fetch upward of Re. 1/- each, fat Rs. 80/- to Rs. 100/- per kg. and single gall bladder Rs. 100/-. Crocodile skin sells anywhere from Rs. 10/- to Rs. 40/- per inch of belly width. In talks with local tradesmen, we understood that dealing in skins has all but ceased from fear of the new laws; dealing in fat and gall bladder continues on a small scale. The enforcement of the Wildlife Act has been well publicized in the Islands where news spreads fast. It may take several stiffly fined example cases before the protective laws can be fully implemented. During a visit in June, 1977, the senior author heard several reports of crocodiles regularly seen on routine ferry runs indicating better protection. The Forest Department Zoo in Port Blair is rearing 5 crocodiles in a new enclosure.

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The following are the notes of Vaughan's trip:

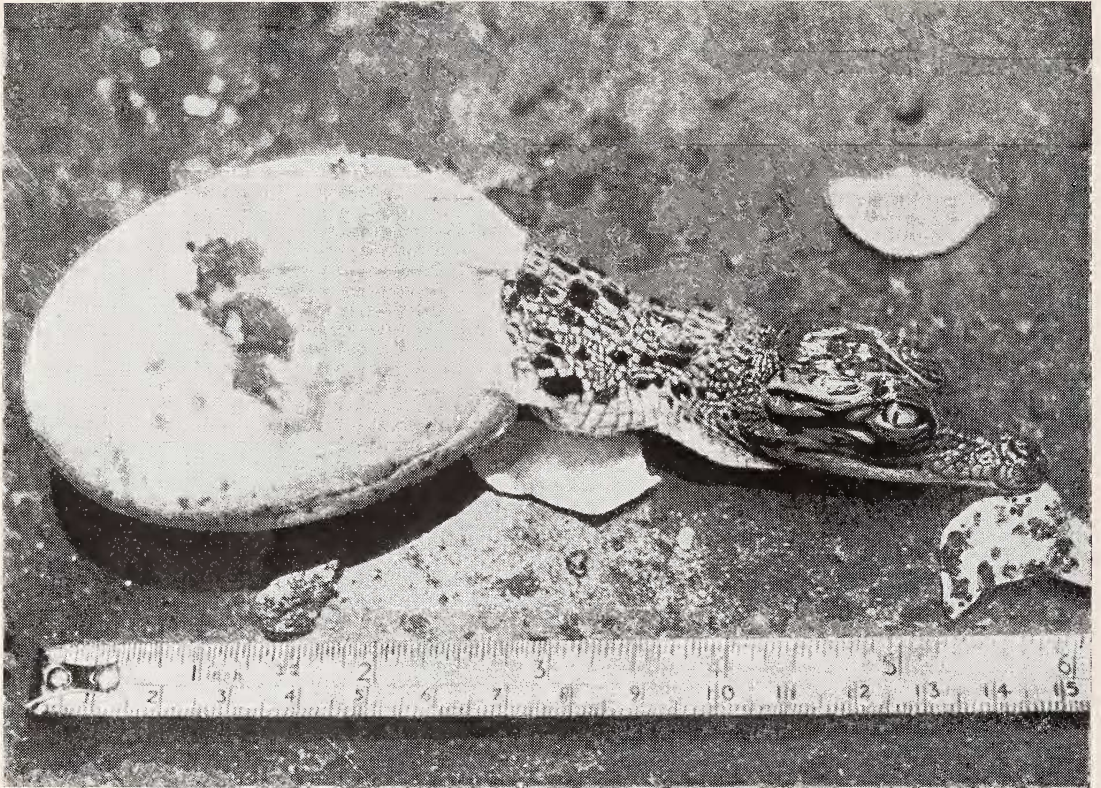
Place visited	Mode of transport	<i>Findings, Remarks</i>
CFO Nullah joins Betapur creek	Boat	One crocodile reported in each nullah; large fresh water plains sown with paddy.
Betapur creek	Boat, Walk	One crocodile seen (3-4 m).
Eratha, Bhakuntala creek, Lal tikri	Boat	Heavy disturbance—Jai Shree Plywood Company. Tracks of three crocodiles seen. One big crocodile 4-5 metres reported by fisherman.
Shubri creek		
Borumbali creek	Boat	Border of Jarawa Reserve—good crocodile population reported here; investigator was not allowed access.
Borneo creek		
Parlogi creek		
Long Island, Bomlungta	Boat	Good mangrove, no sign of crocodiles in day survey and interviewing.
Long Island	Boat	No mangrove—sandy.
Elphinstone harbour	Boat	Good mangrove, but heavy logging activity.
Papitadera	Boat, Walk	Good mangrove habitat; few crocodiles, one big one (5 m) reported.
Kadamtulla, Uthra Jetty	Boat	Border of Jarawa reserve. Trespassing hunters and fisherman report good crocodile population in Reserve.
Atargic Creek		
Baratang	Boat	Saw one crocodile at Khoda Khari, good mangrove, many small creeks; main boat route, few crocodiles.
Port Blair	Ferry	Interviewed old residents.
Mayabandar	Ferry, Walk	Interviewed ex-crocodile hunters, all concur that crocodiles becoming rare except in the Jarawa Reserve.
Kalighat	Boat	One 4 m crocodile reported regularly in main creek.
Ramnagar (east coast, North Andaman)	Walk	One crocodile killed 3 years back, none seen since then. Small creek, no crocodiles.
Kalara Creek-settlement	Walk	Found freshly robbed (by man) crocodile nest in cane near settlement. Very few nesting crocodiles now according to recent settlers.
Mayabandar	Walk	
Kishorenagar (Parangara)	Ferry, Walk	No crocodiles or nests seen.
Kalighat-Mayabandar	Ferry	No crocodiles or nests reported.
Creek on Kalighat	Walk and	3 hatched nests, one full nest found in cane clumps, female nearby. 72 eggs, observed successful hatching some days later.
Parangara route	Boat	
Karmatang No. 9	Boat, Walk	Good mangrove. young crocodile seen recently; much settlement activity.
Austen Creek, 1, 2, 3, 4	Boat	Many settlements, boating activity. Good crocodile habitat but close to Mayabandar. Crocodiles cleaned up long ago.
Stewart I, Rahill I and Khoda Khari	Boat	Good crocodile habitat, vast mangrove, good nesting areas. Too near Mayabandar so crocodiles very scarce.
Burong Creek	Boat	One crocodile reported recently killed on nest and eggs robbed.





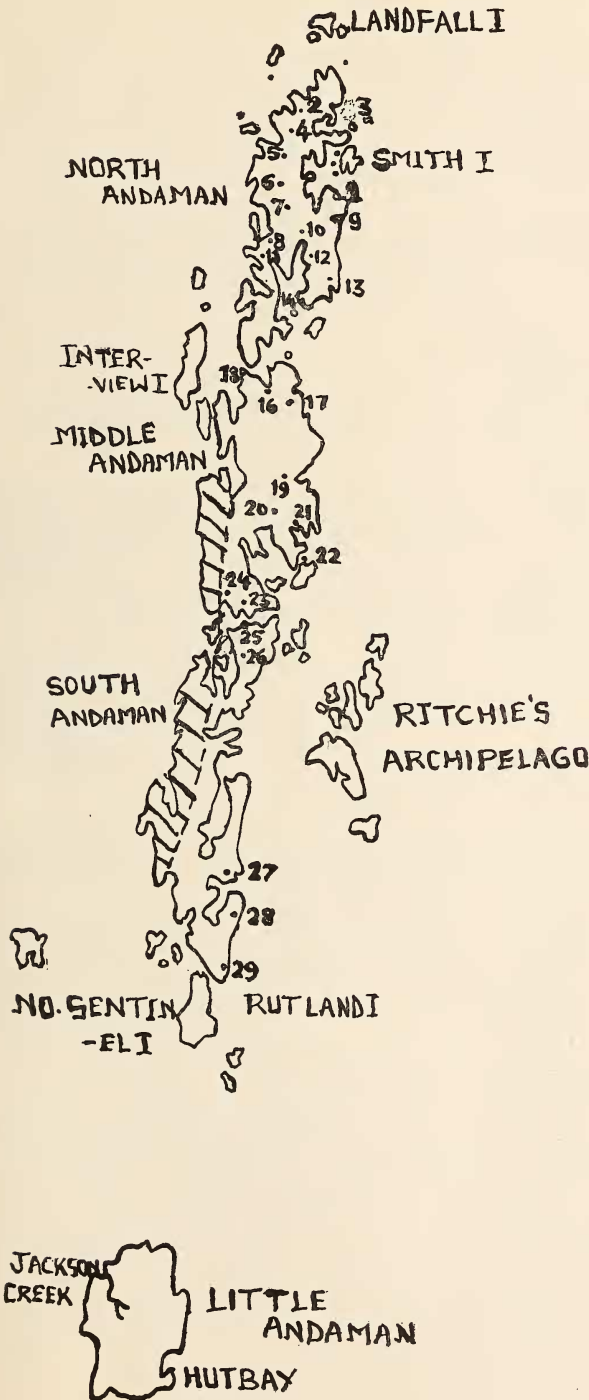
*Above:* Skull at Diglipur from a *C. porosus* 5 m in length. *Below:* Mangrove lined creek in North Andaman.





A hatching of the saltwater Crocodile (*Crocodylus porosus*) in the Andaman Islands.





Places visited during  
 1975 and 1976 Survey

1. Diglipur
2. Shyamnagar
3. Manjudera
4. Radhanagar
5. Milengram
6. Swarajgram
7. Laxmipur
8. Parseemsagar
9. Shivpur-Kalipur
10. Nowgram
11. Parangara
12. Kalighat
13. Ramnagar
14. Stewart I.
15. Mayabandar
16. Panighat
17. Webe
18. Austen Strait
19. Betapur
20. Eratha
21. Rangat
22. Long I.
23. Kadamtulla
24. Aturgic Creek
25. Papitadera
26. Baratang
27. Bamboo Flat
28. Port Blair
29. Chidiatapu

ANDAMAN ISLANDS  
 FROM 1931 CENSUS REPORT

## SURVEY OF CROCODYLUS POROSUS IN ANDAMANS

Some offshore islands like North Reef, East I, Landfall I and islands in Ritchie's Archipelago have been reported in the past to have small or transient crocodile populations. Logging activities, cutting of cane, grass and palms and the growing need for fresh water and land will continue to pressure crocodiles in the Andamans. The Jarawa Reserve, Little Andaman and some parts of the Nicobar are reported to have good, reasonably intact populations; the latter two areas remain to be surveyed.

### ANDAMAN CROCODILE CENSUS

Approximate figures based on initial field surveys and interviews. Does not include Jarawa Reserve.

Place	No. of Breeding Females	Total Crocodiles
North Andaman	50	100-200
Middle Andaman	20	50-100
South Andaman	10	20-30

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### RECOMMENDATIONS

- (a) Complete survey to determine population and habitat available for crocodiles.
- (b) Optimum areas should be offered complete protection as Crocodile Preserves, simultaneously the Wildlife Act should be enforced through adequate field staff.
- (c) Consideration and drawing up of a crocodile conservation/management plan for the Islands.

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